View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by Journal of Health Sciences

Journal of Health Sciences

RESEARCH ARTICLE Open Access

Etiological factors of preterm delivery

Elvira Brkičević[1], Gordana Grgić[2]*, Dženita Ljuca[2], Edin Ostrvica[3], Azur Tulumović[2]

[1]Health Center Lukavac, Majevičkih brigada bb, Lukavac, Bosnia and Herzegovina. [2]Department of Gynecology and Obstetrics, Universitiy Clinical Centre Tuzla, Trnovac bb, Tuzla, Bosnia and Herzegovina. [3]Health Center „Dr Mustafa Šehović", Albina Hreljevića 1, Tuzla, Bosnia and Herzegovina.

ABSTRACT

Introduction: Preterm delivery is the delivery before 37 weeks of gestation are completed. Preterm birth is a major course of neonatal morbidity and mortality, the incidence of premature delivery in developed countries is 5 to 9%. Aims of this study were to determine the common etiological factors for preterm delivery, most common weeks of gestation for pretern delivery, and most commom way of delivery for preterm delivery.

Methods: The study included 600 patients divided into two groups, experimental group (included 300 preterm delivered pregnant women), control group (included 300 term delivered women).

Results: The incidence of preterm delivery in pregnant women younger than 18 years was 4.4%, and in pregnant women older than 35 years was 14%. 44.6 % of preterm delivered women at the experimental group had lower education. In the experimental group burdened obstetrical history had 29%, 17.2% had a preterm delivery, 35.6% had a premature rupture of membranes, 15% had a preterm delivery before 32 weeks of gestation, 12.4% between 32-33.6 weeks of gestation, while 72.6% of deliveries were between 34- 36.6 weeks of gestation. Multiple pregnancy as an etiological factor was present in 10.07% of cases. Extragenital diseases were present in 10.4%. In the experimental group there were 29%, while in the control group there were 15% subjects with burdened obstetrical history.

Conclusions: Preterm birth more often occurs in a pregnant women younger than 18 and older than 35 years, and in a pregnant women of lower educational degree. Preterm delivery in the most common cases was finished in period from 34 to 36.6 weeks of gestation. The most common etiological factor of preterm delivery in the experimental group was preterm rupture of membranes and idiopathic preterm delivery.

Keywords: preterm delivery, etiological factors, complications of preterm delivery

INTRODUCTION

Preterm delivery, defined by the WHO and American Pediatrics Academy is the delivery before 37 weeks of gestation are completed (1). According to the International Classification of Diseases since 2001 the lower limit of preterm birth is ≥22 weeks of gestation from the date of the last menstrual period (or birth weight ≥500 grams). The incidence of preterm birth ranges from 5 to 15%. Preterm delivery is a major couse of neonatal morbidity and mortality. It is believed that the preterm delivery is the cause of neonatal death in 75% of cases and in 50% of cases leads to the creation of permanent neurological se-

*Corresponding author: Gordana Grgić, MD, PhD
Department of Gynecology and Obstetrics, Universitiy Clinical Centre Tuzla, Trnovac bb, 75000 Tuzla, Bosnia and Herzegovina
Phone: 387 61 150 848
E-mail: gordana.grgic@bih.net.ba

Submitted 22 March 2013 / Accepted 7 May 2013

UNIVERSITY OF SARAJEVO
FACULTY OF HEALTH STUDIES

© 2013 Elvira Brkičević et al.; licensee University of Sarajevo - Faculty of Health Studies. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

quelas (2). In the undeveloped part of the world the major couses of the preterm deliveres are infections, malnutrition and poor antenatal care, while in developed countries major couses are methods of assisted reproductions and earlier completition of vunerable pregnancies (3). According to the latest researches of preterm delivery is a syndrome caused by many causes, knowledge of these causes would improve the prevention and treatment of preterm delivery (4). Behr et al., (5) causes of preterm delivery are divided to: fetal, placental, uterine, maternal and other causes. Fetal causes include: fetal distress, multiple gestation, eritroblastosis and the nonimune hydrops. Placental causes are: placenta previa and placental abruption. Uterine causes are the anomalies of the uterus and incompetent cervix. Maternal causes are: preeclampsia, chronic diseases, infections and using drugs. Other causes are: premature rupture of membranes, polyhydramnion, iatrogenic causes. It is believed that premature rupture of membranes is responsible for 1/3 of all preterm deliveris (6). Increased risk of preterm delivery is in young pregnant women and the older pregnant women. Young women more often have vaginal infection, antenatal care is weak and therefore they have the higher incidence of pathological pregnancies. Older women (>35 years) with increasing of age have increased risk of preterm delivery. At this age, greater is the incidence of systemic and degenerative diseases, EPH gestosis, and changes in the uterus. Higher risk is for chromosomal and other fetal anomalies (3). Reproductive history is a major factor in the prognosis for the current pregnancy. Previous artificial abortions have an impact on the occurrence of preterm delivery. Susceptibility for premature delivery increases with the number of previous miscarriages, particularly with the regarding the abortion in the second trimester. The most important factor is the existence of earlier preterm births. Patients who previously had a preterm delivery have a 14% higher incidence of preterm delivery in the current pregnancy. Large share in the development of premature births have anomalies of the uterus (7). Cervical incompetence, characterized as painless cervical canal expansion in the second trimester is often the cause of miscarriage or preterm delivery. The increased concentration of relaxin is an endocrine cause of cervical incompetence (8). Numerous studies have shown that there is an association between increased concentrations of relaxin and the occurrence of preterm birth (9). Multiple pregnancy is an important factor for preterm delivery, accounts for 10-15%, six times more frequent than in singleton pregnancies. It is especially important fruiting low birth weight (<2500 grams), and higher is incidence of intrauterine growth retardation. Psycho-social stress of mother is an important risk factor of preterm delivery. Stress increases secretion of epinephrine, norepinephrine, and cortisol, which leads to activation of placental corticotropin-releasing hormone, leading to the biological cascade that results in a formation of preterm birth (10). Preterm labor of unknown cause (idiopathic preterm labor) is represented in the total number of preterm births and up to 50% (11). In idiopathic preterm labor there is no change in the production of prostaglandins, and it is possible that in these cases is increased the myometrial sensitivity to the current values of endogenous oxytocin.

METHODS

This retrospective study included 600 patients hospitalized and delivered in the Department of Gynecology and Obstetrics, University Clinical Center of Tuzla. All the subjects were divided into two groups: experimental and control groups. In the experimental group there were 300 of preterm delivered patients (24-37 weeks of gestation), control group was coposed of 300 patients term delivered (37-42 weeks of gestation) with same demographic caracteristics. The following parameters were analyzed: maternal age, level of education, burdened obstetrical history (previous preterm births, miscarriages, stillbirth), the presence of extragenital diseases (hypertensive disease-preeclampsia, eclampsia, diabetes, hypothyroidism, hyperthyroidism) weeks of gestation at the time of birth in the experimental group, the prevalence of some etiologic factors in the etiology of preterm delivery in the experimental group, the method of delivery. Etiologic factors are classified into: multiple pregnancy, premature rupture of membranes, idiopathic preterm labor and other causes (placental abruption, placenta previa, polyhydramnios).

Statistical analysis

These results were analyzed by standard methods of descriptive statistics. Statistical significance between samples was tested by χ^2 test at level of α=0.05.

RESULTS

TABLE 1. The age of mother

Group	<18 N (%)	19-34 N (%)	>35 N (%)	Total N (%)
Experimental	13 (4.4%)	245 (81.6%)	42 (14%)	300 (100%)
Control	5 (1.6%)	271 (90.4%)	24 (8%)	300 (100%)

χ^2 test has shown correlation between the age of the pregnant women, and the group they belong to (χ^2=9.77, p=0.008). This tells us that the higher incidence of premature births was in pregnant women younger than 18 and older than 35 years.

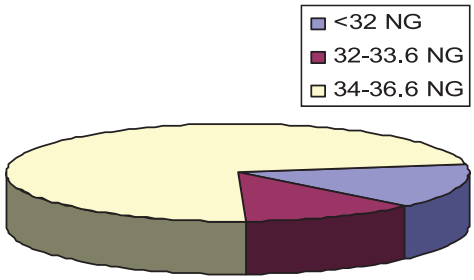

FIGURE 1. Weeks of gestation at the time of birth in the experimental group

Figure 1. shows weeks of gestation in a moment of delivery in the experimental group. The largest number of births was in the period between 34-36.6 weeks of gestation (7.6%), while the smallest number was in the period between 32-33.6 weeks of gestation (12.4%). Frequency of deliveries before 32 weeks of gestation was 15%.

TABLE 2. Level of education (mother's degree)

Group	Housvifes and primary school N (%)	Medium schools N (%)	University degrees and students N (%)
Experimental	134 (44.6%)	120 (40%)	46 (15.4%)
Control	105 (35%)	137 (45.6%)	58 (19.4%)

Table 2. shows that there is a statistically significant correlation between the level of mother's education and membership in a particular group (χ^2=6.03, p=0.049).

TABLE 3. Burned obstetrical history

Group	Yes N (%)	No N (%)	Total N (%)
Experimental	87 (29%)	213 (71%)	300 (100%)
Control	45 (15%)	255 (85%)	300 (100%)

χ^2 test showed a statistically significant association between a particular group and burned obstetrical history. Burned obstetrical history was more frequent in the experimental group. Chance of preterm delivery at present burdened obstetrical history in the experimental group was 2.31 times higher than in the control group (95% CI: 1:55 to 3:46).

TABLE 4. Extragenital diseases of mothers

Group	Diseases of mothers N (%)
Experimental	31 (10.3%)
Control	9 (3%)

Table 4. shows the prevalence extragenital diseases of mothers (hypertensive disease-preeclampsia, eclampsia, diabetes, hypothyroidism). It indicated that there was a statistically significant correlation between the frequency of the extragenital diseases of mothers and the group (χ^2=11.81, p=0.0006). The incidence of extragenital diseases at the experimental group was higher than in the control group. The chance of mothers having preterm delivery is 3.73 times higer in the experimental group if the mother has extragenital diseas than in control group (95% CI: 1.69-9.05).

TABLE 5. Etiological factors of preterm delivery in the experimental group

Eksperimental group	Premature rupture of membranes	Idiopathic pretem delivery	Multiple pregnancy	Other causes
	107 (35.6%)	108 (36%)	31 (10.07%)	57 (19%)

The most common factors are the preterm delivery of unknown cause (36%), and the preterm delivery with premature rupture of membranes (35.6%).

TABLE 6. Method of delivery

Group	Per vias naturalis N (%)	S.C. N (%)	Total N (%)
Experimental	178 (59.3%)	122 (40.7%)	300 (100%)
Control	256 (85.3%)	44 (14.7%)	300 (100%)

Table 6. shows method of delivery (per vias delivery or delivery by cesarean section). It was found that there were a statistically significant association between method of delivery and membership of a particular group (χ^2=49.38, p<0.0001). The incidence of delivery per vias is greater in the control than in the experimental group. Chance of delivery per vias was 3.99 times higher in control than in the experimental group (95% CI: 2.65-6.06).

DISCUSSION

Preterm delivery remains the leading problem of modern obstetrics in the whole world it results in birth of premature infants with a high risk of morbidity and mortality. Reports on the incidence of preterm delivery, partly because of different definitions, different races, ethnic groups, climate, countries and institutions. It is considered that 5-15% of pregnancies end before the date (12). Preterm birth is multifactorial disorder in wich creation are involved various exogenous and endogenous risk factors whose interactions initiated early, start asynchronous delivery mechanism. All risk factors for preterm birth can be classified into the following categories: maternal characteristics, reproductive history and characteristics of the actual pregnancy (13). In our study, we investigated the etiological factors who have lad to the preterm delivery. We investigated the mother age as one of the factors. In our sample in the experimental group was 4.4% of mothers who had preterm delivery younger than 18 years, and 14% of mothers who had preterm delivery were older than 35 years. The incidence of preterm birth was higher in mothers younger than 18 and older than 35 years. The study of Vilendečić et al., (14) found 1.7% of pregnant women preterm delivered who were less than 18 years old, and 11,9% of pregnant women preterm delivered who were older than 35 years. In our research, we got a slightly higher percentage wich is probably related to the sample size of the author. The next parameter is mothers degree. In the experimental group was 44.6% houswifes and mothers with primary school education, the data were compared with the corresponding data of the control group. χ^2 test shown the correlation between the degree and group. In our sample, most prematurely delivered infants were by mothers with lower education, as evidenced in the work of Astolfo-I and Zonta's (15).

Under burdened obstetric history we include a previous preterm birth, previous miscarriage, stillbirth, genital organs surgery, assisted reproduction procedures and anomalies of the uterus. In a study 29% of pregnant women in the experimental group had burdened obstetric history, and in the control group 15%. There were a statistically significant difference between the experimental and control group. Chance for preterm delivery in the experimental group is 2.31 times higher than in the control group. Our study, wich included the total number of pregnant women with the burdened obstetrical hisory, shows that 17.2% of pregnant women who preterm delivered already had a preterm delivery. Mercer et al.,(16) said if you had a previous preterm delivery, the risk of recurrence of preterm delivery in the next pregnancy is more than double. Virk et al. suggest that pregnant women with a previous pregnancy terminations have a significantly higher risk for preterm delivery in the next pregnancy (17). The presence of maternal extragenital diseases (hypertension in pregnancy-preeclampsia, eclampsia, diabetes, hypothyroidism, hyperthyroidism) was evaluated in the experimental and control groups. In the experimental group there was 10.3% of pregnant women with extragenital diseases, while in the control group there was 3% of pregnant women with extragenital diseases. There was statistically significant difference between the groups. The chance of occurrence of preterm birth among mothers attending extragenital diseases was 3.73 times higher in the experimental group than in the control group. The research of Ćurković et al., shows the presence of extragenital diseases in 53% of pregnant women delivered prematurely (18).

In our study, 15% deliveres were before 32 week of gestation, 12.4% were between 32-33.6 week of

gestation, 72.6% were between 34-36.6 weeks of gestation. Multiple pregnancy as an etiological factor was present in 10.07% of cases. Similar results are found in the study Vilendečić et al., where the percentage of preterm delivery completed before 32 weeks of gestation was 13.8% (14). Also, in the study of Vilendečić et al. (14) it is shown that 10.5% of preterm delivery was caused by twin pregnancy. Goldenberg et al. (3) found the presence of about 20% of preterm births up to 32 weeks of gestation, 20% of preterm births between 32-33.6 weeks of gestation, 60-70% is between 33.6-36.6 weeks of gestation. In aur study multiple pregnancy as an etiological factor was present in 10.07%. We analyzed the method of delivery, per vias delivery or caesarean section. In our study 59.3% of preterm delivery has been completed per vias (naturally) more than half, while 40.7% completed surgically by caesarean section. There was a statistically significant association between the method of delivery and groups. The incidence of delivery per vias is greater in the control than in the experimental group. The chance of vias per birth was 3.99 times greater in the control than in the experimental group. Our results are different from the results Vilendečić et al., who has shown that vaginal delivery completed in 77.8% of cases, while the cesarean in 22.1% of preterm births (14). In terms of frequency of premature rupture of membranes different studies show a wide range in preterm and term delivery. While some argue that 10% of all pregnancies is complicated with premature rupture of membranes, 80% of premature rupture of membranes is at term of delivery (19), others state that the premature rupture of membranes as a cause of premature birth is present in the 25-30% of the cases (3). The results of our study shows that preterm delivery with premature rupture of membranes had 35.6% of our patients.

CONCLUSIONS

Preterm birth is more common in pregnant women younger than 18 and older than 35 years of life and in the pregnant women of lower educational level. The largest number of preterm births was completed in the period between 34-36.6 weeks of gestation. Pregnant women delivered prematurely atend to have burdened obstetrical history, and presence of extragenital diseases is also significantly higher. The most common etiological factors who lead to preterm delivery are premature rupture of the fetal membranes and idiopathic preterm labor. Cesarean section as a method of delivery is more common in the experimental group than in the control group.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

1. World Health Organisation. Prevention of perinatal mortality. Public Health Papers 42. 1969, Geneve WHO.
2. Prodan M, Petrović O. Liječenje prijetećeg prijevremenog poroda. Gynecol Perinatol. 2008;17(4):207-215.
3. Goldenberg RL, Culhane JF, Iams DJ, Romero R. Epidemiology and causes of preterm birth. Lancet. 2008;371:75-84.
4. Romero R, Baumman P, Gonzales R, Gomez R, Rittenhouse L, Behnke E. Amniotic fluid prostanoid concentrations increase early during the course of spontaneous labor at term. Am J Obstet Gynecol. 1994;171:1613-1620.
5. Behram RE, Gottof SP, Kliegman RM. The fetus and neonatal infant. In: Behram RE (ed). Nelson textbook of pediatrics. Fourthteenth edition. Philadelphia: WB Sauders Company, 1992:421-525.
6. Guinn DA, Goldenberg RL, Hauth JC, Andrews WW, Thom E, Romero R. Risk factors for the development of preterm premature rupture of membranes after arrest of preterm labor. Am J Obstet Gynecol. 1995;173:1310-1314.
7. Tucker J, McGuire W. ABC of preterm birth-Epidemiology of preterm birth. British Medical Journal. 2004;329:675-678.
8. Iams JD. Cervical incompetence. In: Creasy R, Resnik R (eds). Maternal fetal medicine. 4th edition. Saunders Company, Philadelphia. 1999:445-464.
9. Lee KY, Jun HA, Kim HB, Kang SW. Interleukin-6 but not relaxin, predicts outcome of rescue cerclage in women with cervical incompetence. Am J Obstet Gynecol. 2004;191:784-789.
10. Lu MC, Chen B. Racial and ethnic disparities in preterm birth: The role of stressful life events. Am J Obstet Gynecol. 2004;191:123-135.
11. Newman RB, Richmond GS, Winston YE, Hamer C, Katz M. Antepartum uterine activity characteristics differentiating true from threated preterm labour. Obstet Gynecol. 1990;76:S39-S41.
12. Kuvačić I, Elvedji-Gašapović V. Prijevremeni porođaj. U: Kuvačić I, Kurjak A, Delemiš J. Porodništvo. Medicinska naklada, Zagreb. 2009:323-332.
13. Mirković Ž. Kliničke strategije u prevenciji preterminskog porođaja. U: Radunović N (ur) Novine u perinatalnoj medicini. Beograd, 2012:74-79.
14. Vilendečić R, Perendija V, Savić S, Grahovac S, Ećim V, Vilendečić Z, et al. Prevremeni porođaj i perinatalni ishod. Zbornik radova, pedeseta ginekološko-akušerska nedelja SLD. Beograd, 2006:102-7.
15. Astolfi P, Zonta L.A. Risks preterm delivery and association with maternal age, birth order and fetal gender. Human Reproduction. 1999;11(14):2891-2894.
16. Mercer BM, Goldenberg RL, Moawad A. The Preterm Prediction Study: Effect of gestatinal age and cause of preterm birdh on subsequent pregnancy outcome. Am J Obstet Gynecol. 1999;181:1216-21.
17. Virk, Zhang J, Olsen J. Medical abortion and the risk of subsecquent adverse pregnancy outcomes. N Engl J Med. 2007;357:648- 53.
18. Ćurković A, Sokolović D, Čutura N, Karadžov Orlić N, Soldo V, Zamurović N et al. Neonatalne komplikacije prevremenih porođaja. Zbornik radova, pedeset i šesta ginekološko- akušerska nedelja SLD. Beograd, 2012:100-115.
19. Dinulović D i Terzić M. Preterminska prevremena ruptura plodovih ovojaka (PPROM). U: Davidović M i Garić B (ur). Opstetricija. Novinsko-izdavačka ustanova, Beograd. 1996:595-606.